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ABSTRACT

During the early 1990s, Art Hutchinson, in his role as Park Ranger and Coordinator of Education/School Services at Mesa Verde (Colorado), was exploring possible applications of the early digital information and multimedia technologies. The goal was to provide new experiences for Park visitors on-site as well as for students across the Four Corners region. The authors spent considerable time examining the impact of emerging technologies on Mesa Verde National Parks and related sites. In the summer months of 1995, the National Park Service's Hovenweep National Monument and Kansas State University (KSU) decided to launch the development of a multi-page Web site to provide additional services to visitors. The appearance of the Web site was to reflect the look and feel of the cultural artifacts preserved within the Hovenweep National Monument. Specifically, the design for the Web site not only addressed the subject or primary content of the Monument, but also, reflected that primary content through graphics. The initial plan for the site included the following features: historical information, discussion of the various villages within the Monument, the location of the Monument, other important visitor information items, a link to the National Park Service Web site, a Guest Book designed to provide an opportunity for visitor feedback, and a center for links to other regional and/or related Web sites. Application of lessons from Hovenweep to K-12 settings and teacher education are discussed. (AEF)

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Lessons Learned from National Park Service Electronic Visitors: Implications for K-12 Classrooms and Teachers

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During the early 1990's Art Hutchinson, in his role as Park Ranger and Coordinator of Education/School Services at Mesa Verde, was exploring possible applications of the early digital information and multimedia technologies. The goal at that time was to provide new experiences for Park visitors on-site as well as for students across the Four Corners region. Hutchinson quickly recognized the initial challenges and opportunities being made available through technology and explored various strategies designed to help meet the needs of adult visitors as well as the young people who make up what is being described as the "Nintendo Generation" (National Academy of Sciences and National Academy of Engineering, 1993).

At the same time, John Parmley was exploring applications of the same technologies to enhance student learning experiences in school settings. Having spent his childhood years in the Four Corners region and being familiar with the Ancestral Puebloan or Anasazi culture preserved within Mesa Verde National Park, Parmley approached the Park administration about possible common interests. The initial conversations which began during the early months of 1992 focused on ways to convert still images into digital formats and make those images available on diskettes. Later the focus expanded to include video clips and sound files which could be distributed on compact disks (CDs). These early conversations along with those that followed provided the foundation for a very active partnership.

Consideration of Park's Needs and Opportunities

The majority of the Partnership's early activities were related to school-based activities. Then, in 1995, Art Hutchinson moved from Mesa Verde to the Superintendency at the National Park Service's Hovenweep National Monument and John Parmley returned to full-time faculty status after seven years service as chair of an academic department. During this same time period, several significant advancements were made in computer technology and the Internet. The time was right to focus on opportunities to use technology to enhance Park missions.

During the months leading up to the events of early 1995, the authors spent considerable time examining the impact of emerging technologies on Parks and related sites. The authors found themselves engulfed in concepts such as the Internet, cyberspace, bits and bytes, chat lines and a host of other relatively new "techno words." They watched with care as Parks developed Web pages and acquired electronic visitors who were able to learn a host of facts about various Park Service locations.

During the summer months of 1995, Hovenweep and Kansas State University (KSU) decided to launch the development of a multi-page Web site to provide additional services to visitors. However, implementing this project was not without substantial problems.

The Expanded Hovenweep Web Site

While many features make Hovenweep an intriguing place to visit, many of these same features became significant "off ramps" from the information super highway. Hovenweep is 41 miles from the nearest town and 12 miles from a telephone line. Thus, it became quite difficult for Hovenweep's staff of two Park Service employees to establish a World Wide Web presence beyond what was being developed centrally by the National Park Service staff. At this point, Kansas State University stepped forward and offered to provide space on an existing Web server as well as the technical expertise to develop and manage the site if Hovenweep would provide the content expertise. Suddenly, the barriers of location, staff time, and round-the-clock management disappeared and the Official Expanded Web Site for Hovenweep National Monument was

launched. This partnership arrangement not only provided special opportunities for Hovenweep, it also provided opportunities for faculty and students on the KSU campus an occasion to have meaningful involvement in a highly unusual activity.

The partners began by identifying and developing images for the Web Site. They subsequently used Adobe Photoshop 3.0 and 4.0 to manipulate images. Adobe PageMill 2.0 was used to develop the HTML programming.

Lessons Learned by the Partners

One of the first lessons learned by the partners related to **design** and subsequent functioning of elements within the Site. It seemed important to have the appearance of the Web Site reflect the look and feel of the cultural artifacts preserved within the Monument. Based on that assumption, specific graphics were identified or developed to help tell the Hovenweep story. The initial plan for the Site included the following features:

- historical information,
- discussion of the various villages within the Monument,
- the location of the Monument,
- other important visitor information items,
- a link to the National Park Service Web Site,
- a Guest Book designed to provide an opportunity for visitor feedback, and
- a center for links to other regional and/or related Web sites.

Specifically, the design for the Web Site not only addressed the subject or primary content of the Monument, but also, reflected that primary content through graphics and the use of such applications as black background to reflect the solitude and sandstone textures on appropriate buttons and images to represent the sandstone blocks used by the early Native Americans who built the villages now preserved within Hovenweep.

With the basic design features in place, the partners began making a number of technological and design modifications. These early modifications involved testing such emerging concepts as a short sound file (800K) from an interview with Superintendent Hutchinson. Other related modifications considered during that initial year included an automated slide show option for visitors with additional interests and modification of several features to increase the overall loading speed of the site. The partners concluded that all modifications needed to be tested on their home computers which accessed the Web Site through local Internet service providers. If an addition or modification uploaded in a reasonable amount of time through typical modems and over telephone lines, they anticipated it would generally load in an acceptable manner for electronic visitors. Thus, uploading speed for all features and the need for balance between inviting graphic design and acceptable uploading speed were additional important lessons.

From the very beginning, the partners believed there was a need to provide a personal touch and interact with electronic visitors. The partners also needed to know what attracted visitors to the Web Site, what features they liked, and what features they found troublesome. One of the initial approaches to meeting these needs became the Hovenweep Guest Book. Electronic visitors were encouraged to provide their name, home location, e-mail address, and submit comments and/or questions. These e-mail responses were then forwarded to Hovenweep and KSU. Responses from electronic visitors supported the partners attention to the basic design concerns previously addressed. One early visitor stated concern when the home page for the Hovenweep Site took longer than 30 seconds to load. Input from electronic visitors became and continues to be an important source of decision making data. The partners had learned another important lesson as they considered the various messages they received through the Web Site. Their electronic visitors welcomed the opportunity for personal interaction and involvement in the Web Site.

Summary of Data provided by Guest Book Registrants

Even though technical problems occurred which kept the Guest Book from functioning from early June through mid September 1997, the peak visitation period, the site has accumulated 87 usable registrations.

Visitor Input. From the information provided by Guest Book registrants, the authors have determined that 53 (61%) of the registrant names were male, 30 (34%) of the registrant names were female, and 4 (5%) of those visitors who registered did not provide a name or the name provided could not be identified specifically as male or female. The partners are concerned about the difference between male and female registrations. They are continuing to examine the Web Site and comments from electronic visitors to determine if certain features attract male visitors more than female visitors.

The partners recognize that the current rate of registration for the Web Site is approximately one registrant out of every 40 visitors (2.5%). Visitor recommendations are viewed as important representations of opinions held by the greater electronic visiting public. However, with what seem to be quite low registration rates, care is always exercised before such recommendations are implemented. At the same time, commitments to the need for visitor input and opportunities for personal interaction continue to be viewed as very important and efforts to remedy the problem with the Guest Book registration feature have corrected the problematic situation. This modification should provide a greater accumulation of valuable data during the 1998 peak visitation period if the visitor registration rate approximates that experienced during 1996 when the Web Site received an average of one registrant for every 14 visitors (7%). The

total visitation hits recorded at the time of this writing exceeds 3600.

Location of Visitors. The 87 Guest Book registrations reached the Hovenweep Web Site from the United States (82 or 94%), Canada (4 or 5%) and Sweden (1 or 1%). Visitors from the United States reached the Web Site from 26 states and the District of Columbia with multiple registrations from Alabama, Arizona, Colorado, California, Georgia, Illinois, Kansas, Massachusetts, Minnesota, Missouri, New Mexico, New York, Pennsylvania, Texas, and Utah.

Comments from Visitors. In addition to demographic data, visitors are provided an opportunity to share *unsolicited comments or experiences* related to their experiences with the Web Site and their on-site experiences while visiting the Monument. They also have the opportunity to ask questions and seek additional information. Among the initial findings were: 70% indicated the information provided through the Web Site was helpful and 42% indicated they wanted additional information about Hovenweep. Twenty percent of the registrations provided supportive comments about the artistic design of the Web Site. Those electronic visitors who indicated they had visited the American Southwest and Hovenweep offered comments about the Web Site capturing some of the look and feel experienced by the on-site visitor.

With two years of experience in providing the Web Site, and 13 months of experience with data collection through the electronic Guest Book, Superintendent Hutchinson has concluded the Web Site saves considerable staff time which would have previously been devoted to writing response letters and has reduced some actual expenses associated with mailing packets of information in response to various traditional mail requests. Through this technology, Park Service staff are able to provide rapid responses to paper and electronic requests while continuing to have personal interactions. They are able to track trends in visitation plans since more visitors are accessing electronic sources of information and using e-mail links to request specific trip planning information. The Hovenweep staff has observed a increasing number of visitors arriving at the Monument with copies of the Web pages which they have printed to help them prepare for their visit.

Application of Lessons from Hovenweep to K-12 Settings and Teacher Education

The partners have continued to analyze data provided by electronic visitors and have the following findings and conclusions which they believe have implications for development of K-12 classroom learning sites as well as teacher education and professional development sites.

Design Issues

The partners considered the design recommendations offered by Milburn and Warner (1997) as they designed the Official Expanded Web Site for Hovenweep. Among the design considerations offered by Milburn and Warner are the following:

- The Web is a landscape view while printed paper is a portrait view.
- People get tired of reading sooner and faster on a computer screen.
- You have restricted control over type and layout.
- The Web is a multimedia experience.
- The Web is a hypermedia experience. (p. 58)

The partners also considered the context issues of Hovenweep as they developed separate pages for the history of Hovenweep, discussion of the various villages within the Hovenweep, recommendations for traveling to Hovenweep, and other important visitor information items. Thus, the technical, artistic, and contextual design considerations were addressed as integrated elements rather than separate issues. The authors recommend developers of Web sites for classroom use or professional development purposes approach development activities in a similar manner.

Personal Interaction and Involvement with the Web Site

The partners continue to be heavily committed to the concept of visitor interaction and involvement in the Hovenweep Web Site. Their commitment is based on a desire to provide meaningful experiences as well as access to information. They suggest we consider strategies used by Park Service professionals as they serve their clientele by making the learning and/or recreational experience as enlightening and enjoyable as possible. It seems that one of their secrets to success has long been their ability to help the visitor **understand and appreciate** the resource base over which they have responsibility. This assistance in enhancing the breadth and depth of understanding is referred to as **interpretation**, a concept that should be examined by K-12 educators as well as those helping to prepare K-12 educators.

With a firm belief that significant learning opportunities and experiences can be provided through uses of technology, the partners examined the work of The National Academy of Sciences and The National Academy of Engineering (1995) in a collaborative work titled, *Reinventing Schools: The Technology Is Now:*

> Children have always been explorers, born with the ability to interact and learn about the world. But children today are growing up in a different world. Those between the ages of 3 and 18-and especially children entering school today-are being hailed as the "Nintendo Generation." They live in a world that is increasingly interactive, communications intensive, and knowledge based. They are standard bearers in the technological revolution, having

never known anything else. Because of their ease in and with the information age, society needs their active involvement and interaction.

> The changes going on today create an opportunity and necessity for a transformation in the way our schools function and our children are taught. If we cannot teach our children how to play and work in this world, our children will remain at risk. Education must be based on a model that is appropriate for an information-driven society. We must prepare children for a future of unforeseeable and rapid change. (http://www.nap.edu/readingroom/books/techgap/navigate.cgi)

The initial design of the Hovenweep Web site as well as the partners' recommendations for classroom-based Web sites has been influenced by the works of such authors as Means, Blando, Olson, and Middleton (1993) and Knapp and Glenn (1996). Means, et al. (1993) offer important considerations for using technology in education as they conclude:

> The primary motivation for using technologies in education is the belief that they will support superior forms of learning. For this reason, theory and research in learning provide an extremely important source of ideas. Advances in cognitive psychology have sharpened our understanding of the nature of skilled intellectual performance and provide a basis for designing environments conducive to learning. There is now a widespread agreement among educators and psychologists ... that advanced skills of comprehension, reasoning, composition, and experimentation are acquired not through the transmission of facts but through the learner's interaction with content. This constructivist view of learning, with its call for teaching basic skills within authentic contexts (hence more complex problems), for modeling expert thought processes, and for providing for collaboration and external supports to permit students to achieve intellectual accomplishments they could not do on their own, provides the wellspring of ideas for many of this decade's curriculum and instruction reform efforts. (http://www.ed.gov/pubs/EdReformStudies/TechReforms)

Knapp and Glenn (1996) report on the experience of teachers teaching with technology who say they:

- Expect more from their students and expect their students to take more care in preparing their work
- Can present more complex material (more complex ideas)
- Believe students understand more difficult concepts (concepts requiring critical thinking)
- Can meet the needs of individual students better
- Can be more student-centered in their teaching
- Are more open to multiple perspectives on problems
- Are more willing to experiment
- Feel more professional because, among other things, they spend less time dispensing information and more time helping students learn (p. 17)

Finally, the partners want the electronic visitor to have a feeling of involvement and ownership. The Hovenweep Web Site was intended to provide a variety of experiences rather than simply transmit information. Efforts to accomplish this goal led the partners to include a variety of multimedia, provide an opportunity for visitors to receive an "electronic visitor's certificate" which uses cgi technology to insert the visitors name into the certificate graphic, and the recent addition of the "Hovenweep Visitor's Scrapbook" which provides opportunities for individuals who have visited on-site to share their favorite photographs with the world of electronic visitors.

In a classroom setting such involvement and ownership may be accomplished by providing opportunities for students to make contributions to a Web site which supports an area of the curriculum or by providing opportunities for students to design and implement their own Web pages to capture their interpretation of an area of the curriculum. Regardless of the strategy utilized, anything less than meaningful involvement of students will tend to be received as using technology to facilitate traditional teacher-centered learning experiences.

The authors recommend K-12 educators and those involved in preparing classroom teachers consider the recommendations of Singh and Means (1995) as they make decisions about developing classroom-based Web pages and others possible uses of technology:

> If our goal is really to provide students with a different kind of education—structured around the provision of challenging tasks that can prepare them for a technology-laden world—the most relevant uses of technology are as tools and communication channels . Giving students experiences in selecting appropriate technology tools and in applying technologies such as word processors, spreadsheets, hypermedia, and network search tools to their work supports the performance of complex, authentic tasks and provides experiences that prepare students for the world outside of school. (http://www.ed.gov/pubs/EdReformStudies/EdTech/)

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